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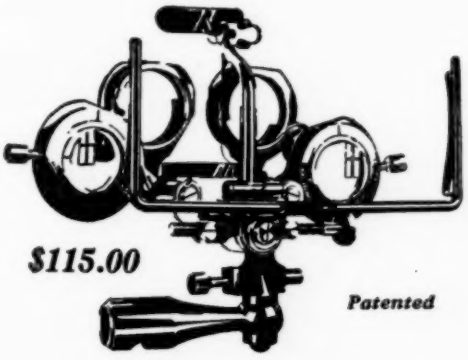

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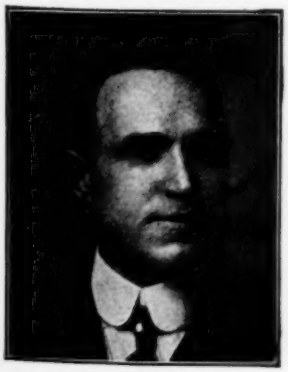

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(My commission expires Jan. 14, 1933.)

VOL. 6 NO. 4

AMERICAN JOURNAL OF OPTOMETRY

REPORT OF THE TRANSACTIONS OF THE AMERICAN ACADEMY OF OPTOMETRY

The sixth annual meeting of the American Academy of Optometry convened at the Hotel Pennsylvania, New York City, on December 4th, 1927, the Chairman, Dr. E. G. Wiseman, occupying the chair.

ANNUAL ADDRESS OF THE CHAIRMAN

E. G. Wiseman, Opt. D., F. A. A. O.
Buffalo, N. Y.

The American Academy of Optometry was formed in 1921 by a small group of mid-western optometrists who had become dissatisfied with the lack of an organization composed of practitioners actuated by a desire for higher ideals and more advanced scientific work.

Naturally, very slow progress was made in the first few years of its existence because there seemed to be too few who combined with the realization of the need of such a group the belief that it could be satisfactorily effected and the willingness actively to engage in the necessary pioneer work.

It was considered unwise to take too seriously the sporadic expressions of desire for such an organization and to force its growth with them as the basis for justification because too often in the past somewhat similar ambitions have been voiced and heeded, with the result that a vast amount of work had been done with no lasting benefit. Rather, real damage has been done because many started idealistic movements of one kind or another and were sadly disillusioned by the mass of inertia and indifference they encountered. In this case we preferred to "sit tight" and wait until the demand became unmistakable.

With the passage of time the qualities mentioned have gradually been awakened. The past year especially has witnessed the rapid growth of an insistent demand that we have an organization which will adequately represent the highest aspects of optometric science and practice and form the vehicle which will help us to travel still farther and faster in the direction toward which so many of us be-

lieve optometry is progressing. Instead of silently wishing, the professional spirit in this respect is fast becoming exceedingly articulate.

Some of us believe that the Academy is amply capable of fulfilling all functions which may be desired. It is true that the basic requirements of the Academy, for details of which you are referred to the Chairman's 1926 address[1], prevent its growth to large proportions for a number of years but, on the other hand, it will most decidedly be composed of an exceptionally high percentage of the very best practitioners in the country. These men are genuinely in earnest in their desire to promote our highest ideals with regard both to externals, such as manners and methods of projecting optometry upon the public mind, and to the development and dissemination of scientific research.

Of course the Academy idea meets with bitter opposition here and there. Some even question the moral right of a group of similarly-minded men formally to organize such an institution as ours and place any restrictions upon the membership. They would have it open to all. There would be no point in creating a body on that basis for it would soon degenerate into a politico-debating society. We have too many examples of the kind to want to emulate or duplicate them.

As now constituted, there are many excellent men prohibited from joining, and some perhaps may obtain entrance who will not be as desirable as could be wished but at least we have some control over this and can rest assured that the average will be high and that the probability of disturbing elements entering our deliberations will be as small as can reasonably be hoped.

It is expected that the American Academy of Optometry will constitute essentially a study group and a mutually helpful group, and that it will gladly pass on the results of its investigations to the entire optometric profession. Up to date we have been unable to engage in any scientific work, other than through papers and discussions such as will be presented here today, but as we become stronger our funds for such purposes will be sufficiently augmented to permit this.

To facilitate progress in this particular, your chairman recommends the appointment of two special committees—Membership and Scientific. The duty of the first should be to seek out those practitioners who constitute available material for Academy membership, investigate their methods and qualifications and submit to the Executive Council the names of those whom they find will fulfill our requirements.

The duty of the second shall be to determine the specific research upon which the organization should engage and to carry out this work as far as our funds will permit.

There has also been appointed a Policy Committee which is to

[1]The American Academy of Optometry. Vol. 1.

pass upon the publicity and location of the small town practitioner and such other delicate points as may arise but regarding which it would be unwise to lay down hard and fast rules.

There should also be a Program Committee, co-operating with the Scientific Committee, for the purpose of formulating the program of the meeting months in advance.

The future of the Academy depends entirely upon the individual members. They must show interest and make strong efforts to attend the meetings. They should be willing to contribute well-prepared papers at any meeting after having received due notification. They can assist very vitally in growth of membership, which will control our efforts at scientific research, by recommending for invitation those whom they know positively can meet the requirements.

Dr. Charles E. Cox, the Secretary-Treasurer of the American Academy, was then called upon to give his report. This revealed that twenty-three optometrists had been awarded fellowship during the past year and that on this date there was a balance of one thousand thirty-nine dollars ($1,039), in the treasury. This concluded the afternoon session.

The American Academy of Optometry reconvened at eight o'clock, the Chairman, Dr. E. G. Wiseman, occupying the chair. Dr. Wiseman introduced Professor Fredrick A. Woll, of the Optometry School of Columbia University.

MUSCLE ANATOMY AND PHYSIOLOGY

Fredrick A. Woll, Ph.D.
New York, N. Y.

Dr. Woll started his lecture by making the statement that "I will address you this evening as an Anatomist and not as an Optometrist. I do this because I do not want to be prejudiced. One of the tasks we, as teachers have, is to train students to think, and the manner in which I will present my topic tonight is, in a measure, based on the pedagogical theory that if the listeners can be made to think while absorbing a lecture, then a more lasting impression and more satisfying effect can be created. Thus, I shall try to make you think."

Dr. Woll then brought out the fact that there are three kinds of muscles: voluntary, involuntary and cardiac. He made a cross-sectional drawing of a voluntary muscle and called attention to the distribution of muscle fiber. He showed how the fibers are grouped, and how each fiber is enclosed in a sheath; this sheath is called sarcolemma. The sheathed muscle cells are held together by a connective tissue called endomysium, and a group of such connected muscle cells are enclosed in another sheath of connective tissue called epimysium. Such enclosed groups of muscle cells are enclosed in a membranous sheath called perimysium.

With this complex structure laid before his audience, Dr. Woll reverted to the discussion of the muscle fiber, or as he preferred to call it, the muscle cell. He brought out the fact that every muscle cell is a complete chemical laboratory in itself.

In discussing the physiologic requirements of a cell, Dr. Woll clearly established the fact that the chemical elements required to keep the cell in good condition were as variable in formula as there are kinds of cells. In other words, that each cell required a different combination of chemical elements to keep it in good physiological and anatomical condition.

Dr. Woll then said that a cell has the power to contract but never relaxes completely. It contracts to varying degrees but does not relax completely except when it is dead. The following are a few of the important points emphasized by Dr. Woll:

"An important physiologic requirement is rest. The more a cell acts in its contractings, the more it must rest. Rest periods are, in many instances, only a pause."

"A heart with a heart beat of 70 times a minute will in twenty-four hours do enough work to lift one pound several hundred thousand feet."

"In all of the muscles of the body, it will be found that the mount of work which might be represented by the acts of contracting is especially great, but in contrast to this, the result is comparatively disappointing when compared with the energy expended."

"When an individual is round shouldered or has some other form of posture abnormality, he sometimes goes to a specialist who prescribes exercise. This specialist depends on fundamental practices born by the results from experience."

Dr. Woll then took up the topic of muscle action and divided this topic into three subheadings: First, concentric contraction; second, static contraction, and third, eccentric contraction. A concentric contraction is a contraction in which the muscle relaxation or contraction is due to the increase or decrease of the fluid received by the cell. Muscle contraction is a shortening of a muscle fiber.

Static contraction is that form of muscle contraction by virtue of which the muscle contraction stops at a given point. A complete static contraction is the fullest contraction of which a muscle is capable and then held. Eccentric contraction is that state of muscle contraction in which a muscle is contracting in an endeavor to hold a load that is beyond its power with the result that the muscle will be in a state of contracting though lengthening because of an overload which it is trying to overcome. In muscle action, we always have the protagonistic and antagonistic muscle arrangement so that there is always a combat in every muscle action. The conquering muscle determines the result of muscle action. When protagonistic and antagonistic act equally, there is a state of stability.

Dr. Woll then pointed out that there were three phases during muscle action: First, electric—the impulse sent to start the muscle going; second, thermal—the heat created due to the chemical action in the muscle being used; third—mechanical—the action that is produced, the response or, what the psychologists call, the response to the stimulus.

Dr. Woll then said that the specialist who treats posture knows that there is muscle inertia. He, therefore, causes concentric contraction of the apparently faulty muscle. His principal difficulty lies in the isolating of muscles, but he usually finds it necessary to exercise muscles in groups. If you exercise a muscle to an extreme, you must hold the muscle in its state of extreme concentric contraction. The antagonist must not be exercised when the protagonist is to be strengthened because the antagonist does not need the exercise. An important point to be borne in mind is that exercise represents the use of the muscles and that rest periods must be in proper proportion.

The following is, he claimed, another point to be borne in mind in muscle exercise: If there is good physiologic functioning, then exercise by virtue of its increased demand increases the functioning of a muscle with the end result of further structural development. The suddenness of a physiologic demand will be met by as sudden a

physiologic supply. It should be apparent to all that the study of general anatomy and physiology is as fundamentally important to an Optometrist as any of his basic optical or optometrical subjects. By producing the maximum of contraction in the protagonistic with a minimum of contraction in the antagonistic muscles, the best results can be produced, and, for the best results in "muscle correction" the muscle to be corrected, or improved, should be held in a complete concentric static condition. That will aid in the correction because a muscle has a tendency to hold the position in which it was last used. Disorder is the result of overwork. Rest brings about physiological order.

In summing up, Dr. Woll presented the following as the results of muscle exercise: First—an immediate, transient and local increase in the blood supply of the muscle. Second—An immediate, transient and local increase in the lymphatic and venous drainage of the muscle, Third—An immediate and transient increase in the heart rate, blood pressure and rate of respiration (vital function). Fourth—An immediate and transient increase in the superficial circulation of surrounding parts. Fifth—A later, more lasting increase in the size, strength and functional endurance of the exercised muscle, (a part of tonicity). Sixth—A later, more lasting decrease in the length of the exercised muscle (another part of tonicity). Seventh—A later, more lasting increase in the size and strength of the tendons, ligaments, sheaths, bones and joints directly associated in exercise (more of tonicity). Eighth—A later, more lasting increase in the size and efficiency of the nerve cells in the exercised motor centers. Ninth—An improvement and perfection of old neuro-muscular co-ordination. Tenth—The establishment of new neuro-muscular co-ordination with the possibility of developing new parts for the efferent and afferent nerve impulses. Eleventh—An improvement in the blood and lymph circulation (special or general). Twelfth—A perfection of existing neuro-muscle co-ordinations. Thirteenth—An increase in general catabolic activity. Fourteenth—An increase in circulation of the products of chemical activity of all tissues and organs associated directly and indirectly in the exercise. Fifteenth—An increase in the desire for rest after the exercise, and a desire for complete rest—sleep. Sixteenth—An increase in the anabolic activities of all of the tissues concerned directly and indirectly with, therefore, a general, structural and functional benefit. Seventeenth—A gain in weight or increase growth (or both), continuing until metabolic equilibrium is re-established. Eighteenth—A perfection of the physiologic efficiency of the orgna. Nineteenth—A better development of the potential powers.

Each one of these nineteen subdivisions is an integral part of tonicity, or in other words, the production thereof or the bringing about of the potentiality of a muscle.

Tonicity is a readiness in the electrical or chemical phase to

activate or motivate in terms of physiological readiness and preparedness. Tonicity may, therefore, be said to be an active alertness, or a willingness to spring into action, arrived at only by actual use.

DISCUSSION. Dr. E. E. Hotaling asked if it is unusual that we find a defective rectus muscle, that is to say, one that is slow in its response?

Dr. F. A. Woll answered this by saying that if the muscle is in its place, the impulse is the element we are concerned in, in this type of case. When recti muscles need exercise, it would also indicate that the entire system would need exercise, which must naturally include an element of play for the best results to be obtained.

Dr. E. G. Wiseman said that in doing kratometric work, we often find a neuro-muscular status that is abnormal. A prism is then prescribed for constant wear. The abduction does not change. We then give more prism for constant wear and the abduction continues as before. What then is the anatomic status of these exterior recti muscles?

Dr. F. A. Woll thought that whenever we prevent a tissue or organ from working that its anatomy and physiology deteriorates. We must work these muscles; not give them less to do, if we want them to be active, healthy and well functioning.

Dr. E. G. Wiseman said that his conception of muscular action was that it developed muscular tissue.

Dr. F. A. Woll agreed, saying that a muscle that has little or nothing to do will loose in both size and power to function. He added that Dr. R. M. Peckham was correct in advocating general exercise in those ocular cases suffering from muscular insufficiencies.

Dr. H. R. Higley inquired as to the possibility of mental conditions having anything to do with faulty muscular response.

Dr. F. A. Woll agreed, saying that he preferred however to refer to these cases as nervous rather than mental, feeling as he does that much of this type of disorder is brought about by a lack of physical exercise.

Dr. B. W. Hazell then referred to the nineteen subdivided results of muscular exercise asking if those subdivisions referred to voluntary muscles only.

Dr. F. A. Woll answered this in the negative saying that these results applied to all muscular tissue.

Following this short discussion Dr. Woll then presented his second lecture.

THE EVOLUTION OF THE HUMAN EYE

Fredrick A. Woll, Ph.D.
New York, N. Y.

Dr. F. A. Woll introduced this subject by asking the question "Why do we have eyes?" The most feasible answer to this, he said, is that nature always meets a demand. In the early development of animal life there was no need for sight, and until animal life had been developed to a point where sight was necessary, nature did not provide any means for this function. He showed how, when unicellular bodies were created, their entire body had a part in every function which they were capable of exercising. There were no individual organs in these unicellular bodies to meet the demands of eating, drinking, digestion, excretion, feeling, etc., but that every part of the unicellular body was so constituted as to make it capable in its limited way of exercising these functions.

The next creative step came when these unicellular bodies developed the function of motion, and since animals usually proceed in the direction of the long axis of their body, the forward end experienced a greater demand upon it than did any other part of the body. Nature stepped in at this stage of the development and provided a more sensitized condition at the forward end than at any other part of the body. The head end, therefore, became the part that interpreted the greater portion of the stimuli received by these animals. By virtue of this condition, and through the experience of practice, differentiation of tissues developed. The fact that survival was possible only for those who developed differentiation and alertness aided the evolution. Among the various stimuli received by these primitive forms of animal life was that of light. Light struck the head end and the interpreting ability of heat, rather than that of light-influence, was developed.

The next development provided by nature was the creation of that set of animals having eye spots. These spots cannot be considered in the same way in which we consider the eye today. The eye spots are sensitive to the heat element in light. "Heat has always been a valuable stimulation," said the speaker, "and the skin cells, which have been called eye spots, were for the purpose of interpreting the differences in the degree of heat stimulus." This might be said to be the first stage of the development of the eye, and it may be further said that the eye developed as the result of there having been light. Exposure of the skin to the sun develops pigment, and these eye spots can be generally said to be nothing more than slightly pigmented areas with nerve contacts.

The chiton seems to be among the animals, which exhibited the first eye spots, but as has been said before, this eye was nothing more than a slight saucerlike depression in the skin, slightly pigmented and which made possible light intepretation in terms of heat.

The solen was the next step in the development of the eye, and in this case the depression is slightly cupped, more pigmented, but again its interpretive function is limited to that of the differentiation between degrees of heat.

Next came the limpet, a sort of shell fish. Here the eye spot represented a deeper cupped eye than that of the solen, and still more heavily pigmented. An interesting fact in the development of these eye spots is the fact that as nature provided them in larger and more sensitive form, the number of spots per animal was reduced.

The animal representing the next development of these spots is the nautilus. The cupping in the case of the eye of the nautilus is more spheric than in the preceding examples, and represents a spheric cavity with a pinhole opening, thus forming a veritable camera obscura. The cavity was filled with sea water and the nerve connection is the first indication of what might be called the development of the optic nerve and retina and rudimentary choroid. Here also is first found the ability to interpret light as such and not merely in terms of its heat element as in the lower forms.

All eyes up to this point in the evolutionary process are skin spots. The first real eye, as we consider them today, are those of the snail, there being two, one at the end of each eye stalk representing at first glance somewhat the appearance of a round headed pin. In all of the stages of development, there has been a gradual increasing of pigment, and the eye of the snail is the first that has a definite transparent front covering or cornea. The hollow cavity in this case is filled with a substance akin to the vitreous of the human eye. The pigmented layer has developed to what might be called a retina, and there is also a deeper layer resembling the choroid. The nerve is composed of a bundle of fibers and is, in appearance, the equivalent of the optic nerve of the human eye.

Next came the eye of the squid, in which we find the first indication of a crystalline lens and iris. Experimentation has also proved that this eye has no distant vision, but like the eye of the snail, has a cornea, vitreous, retina, choroid and optic nerve. This eye has developed after having passed through all of the previously recorded stages and represents the highest development in invertebrates.

At this point, the speaker made the statement that the embryonic stage is the important stage of the consideration of the development of the eye, and thus the development of the eye of the squid can be noted as passing through all of the elementary stages spoken of previously by the speaker.

As the egg of the squid is taken under observation during incubation, each step can be observed. First the slight pigmented spot,

then the gradual increasing in cupping and pigmentation, and finally the complete eye which very closely resembles, in structure, that of the human being.

The principal difference between the eyes of this stage of development and that of the human eye, is the lack of an optic nerve head. The reason for this is that each nerve fiber from the rods and cones leaves posteriorly. From this form of structure, it can be readily seen that these eyes have neither blind spots nor yellow spots and that there cannot exist any form of central vision or fusion. The most sensitive spot, however, is probably over the nerve head, and there seems to be some rudimentary color vision.

The speaker than asked, "When and how did the vertebrate eye develop?" He answered this by saying, "Somewhere between the developmental stages of the skin cell, there must have been found the need for the creation of a vertebrate eye, but where this occurred, no one knows."

The vertebrate eye is formed by an extension of nerve tissue to meet invagination of skin. The physiological irritation from this contact causes a thickening of the tissue which indents and forms the eye. The retina of this eye is no longer transformed skin, but is now an extension of the brain. It has been determined that vertebrate animals have greater color perception and discrimination than do the invertebrates. This may be party due to color addition, experience or knowledge, as this may be applied to our central field. Our peripheral color sense is limited to an interpretation of shades of grey.

The lower animals have but one function for eyes—seeing laterally. Opposite sides are, however, joined in the cerebellum, and protective responses are manifested in the muscles of the side opposite to that being stimulated by light.

It is noted in the evolutionary process of the development of the eye that increased refinement in structure and function are provided as the demands continue to grow, but that nature will not be hurried and that the requirment seems at present to be a little in advance of the development in many cases. The chiasm, single binocular vision and better accommodative facilities are examples of this process of development. It may well be said that the requirements on all of our ocular functions as they exist today could not be made by the eyes of those who lived a few hundred years ago.

Dr. Woll urged optometrists to lay aside the consideration of the eye as a single unit and apart from all other parts of the body, but to take into consideration in their diagnosis that the eye is a part of the body and the condition of the body has its effect on the eyes.

Under the heading of comparative ocular anatomy, Dr. Woll brought out a number of interesting facts, and as an example, cited the eyes of a spider which are in reality, multiple eyes—a central eye surrounded by peripheral eyes, the peripheral eyes supplying the

function of sentinel to give the alarm of approaching objects and the central eye as an analytical element.

Carrying this subject further along, he emphasized the fact that in dogs, cats and animals of these types, the lids are fused until some time after birth until the interior structural detail is completed. In humans, babies keep their eye-lids closed for some time after birth for the same reason.

In the insects, all the individual eye requirement is grouped into a single group or multiple eye, the multiple eye being composed of from 2,000 to 50,000 sectors, conical or pyramidal in form, with their bases exposed, the sectors being joined together so as to make a solid, clear hemisphere with a faceted surface. The apexes of these sectors point toward the center where a ganglion is found joined to what is the equivalent of the optic nerve. This ganglion is covered with pigmented layer resembling a retina.

Along with the evolution of the mechanical parts and the receiving and interpreting portions of the eye, it became necessary to develop a receiving and sending station in the brain. As may well be said, we have the power of looking, seeing and understanding. All of these individual acts are the functions of or contributed to by the eye—the most perfect organ extent.

Following Dr. Woll's lecture, an informal business meeting was held, at which time Dr. E. G. Wiseman discussed the requirements for admission to the Academy. The report of the Rules Committee by Dr. J. H. Drakeford was read, but action was deferred. The various phases of membership requirement were discussed. The underlying purpose which caused the Academy to be organized was presented, and the aims and object to be striven for were laid before the meeting by Dr. E. L. Ryer, Dr. H. C. Doane, Dr. E. Petry, Dr. C. E. Cox and others. This concluded the evening session.

REPORT OF THE TRANSACTIONS OF THE AMERICAN ACADEMY OF OPTOMETRY

Monday, December 5th, 1927, the American Academy of Optometry reconvened in the lecture room of the Physics Building of Columbia University, the Chairman, Dr. E. G. Wiseman, occupying the chair. Dr. Wiseman introduced Dr. Oscar L. McCulloch.

GENERAL PROCEDURE IN HANDLING KRATOMETER CASES

Oscar L. McCulloch, Opt. D., F. A. A. O.
Holyoke, Mass.

It has been my experience that there is a variation between the results of a phoria test as obtained by means of the rotary prism, loose prisms employed with a trial frame and what I believe to be the better method as obtained by the use of the prism bars of the Kratometer. With this arrangement there is very slight chance of error as the prisms are held in position before the eyes as they should be and also they are considerably nearer the eyes than with most other methods. For really fine, scientific work along this line, it seems that there is little excuse for our taking phoria tests in any other manner. If we are easily satisfied with the old slipshod methods then we can use the Maddox Rod instead of the Savage method. This sort of a phoria test was intended to be taken under atropine, and being invented by and used by ophthalmologists, it has a proper place in their method of examining eyes, but for an optometrist to use it seems both awkward as well as inaccurate, especially when the Savage method is so simple of application. I think the only exception to this might be in the taking of the vertical phorias. These can be taken with a Maddox Rod fairly accurately as the convergence is less likely to affect the findings.

Before any ductions are taken it is well to study the fusion sense in detail. It is time well expended in doing this. The Kratometer offers an almost ideal instrument with which to study this function. The method which I follow as a routine is to set the instrument at the proper pupillary distance for near point with the septum in place, farther from the patient's face with wide pupillary distances and nearer with narrow ones. Then place the prism bars with their bases **out**, ten degrees (10^{Δ}) before each eye. Ask the patient to then place his chin upon the chin rest and adjust the instrument until he is comfortably placed and is looking through the apertures slightly

downward at the card upon the reading rod in front. All of this time he has had nothing of a definite nature to look at. I then ask the patient to close the eyes for a moment and upon opening them immediately ask him to describe what is seen. In this way I have given him no hint as to what he may expect to see so, therefore, the answers should be trustworthy. The card to be used first is the No. 3 or F-L card devised by Peckham. If normal, one should see an E with the normal amount of prism (20Δ) base out. If there is a tendency for the patient to say that first he sees E, then F, then L, and it sometimes changes so fast that he cannot state the changes because they are so rapid, then it is evident that there is imperfect fusion. There are patients who will only see one letter at a time, either F or L, but never the two simultaneously. These people have an alteration of vision between the two eyes and unless they were examined by means of the Kratometer it would probably never be ascertained: It is but one of the various forms of suppression, suspension or suspenopsia. There are scarcely two alike, but they all present the same general phenomena, the constant changing of the position of the letters.

Also there is the type of case which sees the F-L separated vertically. Sometimes this is described as merely an imperfect joining of the F-L to form E and then again it is plainly visible to the patient. Of course, this at once suggests a hyperphoria and a note should be made to investigate it at some later period in the examination. So you see there are many things to be found out from this simple test. It only depends upon the keen observation of the examiner to find many of these apparently obscure conditions. It is just these things which in the aggregate either spell the success of the refractionist or his failure.

In taking the abduction at distance a fairly large colored picture such as the cover of a Saturday Evening Post or anything which will retain the patient's attention seems to me to be the best test object. As before, adjust the pupillary distance correctly and remove the card holder from the instrument or at least lower the rod as far as possible and turn down the card holder so that it won't be in the line of vision of the patient. Place the distance correction of the patient in the cells of Kratometer next to the patient's eyes and place prism bars in position at zero base in. Now direct the patient's attention to the object at infinity and ask to be informed when the object starts to blur. If this happens within a few prism diopters then it indicates that the connection between accommodation and convergence is quite loose and if the patient be esophoric, it will not be an extremely hard task to break it down. This is especially true if from the blur point on to breaking point or diplopia is considerable. After having ascertained the point of blur and point of diplopia then the next thing is to find the point at which the patient can recover a single image. This is very important. If it be below the

point of blur then the patient is surely a candidate for base in Kratometer training, both to build the amount of abduction and the ability to handle it flexibly. Also the point of recovery is the pivot from which is determined the amount of prism to be prescribed in the case of an esophore.

The abduction at the near point is taken in the same general manner as that at distance with these exceptions. The pupillary distance is narrowed to that of the near point and the object used is the familiar checkerboard of Peckham. Naturally the near-point correction is used and this applies even if the patient is not an actual presbyope. I use the correction I have previously obtained by the use of the cross cylinders at this point. Again the point of blur is obtained as the prism bars are increased in power.

Also the point of diplopia is found as well as the point of recovery of the single image. These are all important because upon their proper interpretation is determined the course of treatment you are going to pursue for the alleviation of the patient's difficulties. Usually a low point of blur and a fairly high point of diplopia means a latent hyperopia. A point of blur and point of diplopia almost simultaneous shows that there will not be found very much latent hyperopia if any at all. If the point of recovery is low it indicates a lack of control in the central nervous system and Kratometer treatments with base-in prisms are indicated. These are the cases which have puzzled some of us in the past. Often it was found that the patient was exophoric at the distance an equal amount or less at the near point, or was esophoric at distance and near and yet the Kratometer showed us an apparent convergence insufficiency at the near point. Naturally the two things are incompatible, especially the esophore whom we should consider as overconverging and yet the Kratometer shows him unable to converge at the near point. It is simply that the ability of the abduction has been worn to a frazzle and its innervations become so sadly confused that it registers an apparent paradox. The wearing of base-in prisms and the treatment with base-in prisms serves to remedy this difficulty and the pseudo convergence insufficiency disappears. This is a point where many men make a serious mistake in giving base-out treatments instead of base-in. They interpret the convergence difficulty as being due to inability of the internal recti to turn the eyes in and instead it is an inability of the external recti to let go and allow convergence to take place. These are the cases in which there is usually found a considerable latent error which has been uncorrected. Abduction is a very fascinating study and it seems that almost every time it is taken something new is learned about it.

The adduction has been a very much emphasized function and really it is less important than it seems. When it is depleted, it responds quite readily to training and isn't half the problem that abduction appears to be. Usually I take the adduction at near only as at

the distance it is only a supplementary and reserve function and normally is not used. Any image upon a card such as the postage stamp or Indian card of the Kratometer serves as an object of fixation. The pupillary distance should be set at two to four mm narrower than the actual P. D. of the patient at near because of the fact that in adduction the eyes turn in farther than their normal during reading.

Of course the near correction is used and the prism bars are placed base out at zero. They are moved so that the prism power increases rather rapidly until diplopia occurs. The next power below this represents the amount of adduction that this pair of eyes are capable of exerting. Now take it again in exactly the same manner and if it registers more in amount than the previous trial it would indicate that innervation is good. To be sure try it again and then run the slides back again until single vision is obtained. In those cases which can increase their duction upon the second or third trial it will usually be found that their point of recovery is very close to their point of break and regardless of amount this type of patient can read with ease for long periods. However, the one whose adduction is less upon the second or third trial and whose point of recovery is low has difficulty with reading and plus lenses are not necessarily the remedy. This patient is in need of treatment with base-out prisms, if it has been found in the phoria tests which have preceded that exophoria existed at distance with at least as much or more at the near point. I never take the adduction of an esophore or myope, for as Peckham has so plainly pointed out, the esophore already converges too much and the amount is not necessary to be known. Likewise, I believe, there is danger of starting a train of innervations with the myope which will lead to an increase in the myopia.

The vertical ductions are best taken on the Kratometer in the following manner. The correction used is the one used for the distance at which the test is to be made, as well as the P. D. It may be taken in a binocular manner with the familiar card with a common X with the letter R above and the letter L below a common heavy dotted line. This calls for prism base out to fuse the two images and in cases of suspension it is an invaluable test and about the only one which will work out satisfactorily because it immediately serves as a check upon the eye that suspends. When one eye suspends in any duction one will get a false reading because the result will not be diplopia until the eye again regains its power to see. However, if this condition has been carefully investigated in the test for fusion sense and suspension is ruled out, I feel that the test with the checkerboard single card is better as no prism is needed to fuse. This leaves the eyes in a normal condition as they would be used and I feel that in anything which we do the nearer normal we make our tests the more accurate they will be.

The vertical prism slides are placed in the Kratometer base-up

over the right eye and base-down over the left eye. The patient is instructed to watch the horizontal lines of the checkerboard and is asked to count them. If there are five then he is asked to inform you the moment he sees six, and the slides are slowly moved up and down respectively until this occurs. The next lowest amount is the measure of that half of the vertical duction. Then the slides are reversed to base-down over the right eye and base-up over the left eye and exactly the same procedure gone over again. If these amounts are equal then there is no hyperphoria present and the measure of it if there is a difference is the amount of difference between the two amounts. This is quite a simple procedure and it is not necessary to know whether it is a right or left hyperphoria as the correction is simply the building up of the weaker duction by means of Kratometer treatments with the vertical slides.

Convergence relaxation treatments should be given to esophores at all distances at which the esophoria is present. These should be given daily, if possible, and also at the same hour of the day. Those whose abduction is low but the recovery is good need only to be given base-in treatments within the limits of diplopia. That is, trying not to produce diplopia, but approaching it as nearly as possible. Then the patient is instructed to close the eyes and the slides are returned to zero and the same thing done over and over again. The time devoted to each patient should be from ten to twenty minutes interspersed with short rest periods. It is essential that no conversation should be attempted while the slides are being moved with the exception of the patient warning you if diplopia occurs. In case it has been found that recovery was poor or insufficient, then I would instruct the patient to keep his or her eyes open and as the point of diplopia is approached the slides are reversed and worked back to zero. This same thing, repeated over and over again, will build abduction both in quality and quantity but patience upon the part of the optometrist and patient is greatly needed as the recovery is usually slow.

Adduction reserve needs to be built up very rarely unless there is a convergence insufficiency present. The treatment of it is exactly the same procedure as for convergence insufficiencies.

Treatment for better motility of the eyes is accomplished by running the prism slides opposing each other rapidly up and down while the eyes are focused upon some picture or small object at the near point. This is a trouble of which the chief complainants are stenographers who are forced to look from right to left or vice versa without moving the head very much. They exhibit good ductions usually but lack in the ability to quickly change from one position to another. Sometimes it is necessary to increase the amount of their ductions by proper treatments and the basis of this is again the phoria condition. This is perhaps the reason why a certain method is so popular. Practically the same training is accomplished by instructing the

patient to hold the head immobile and rotate the eyes to the right, left and up and down as far as possible. It simply brings a better blood supply to them and gives them better tone.

Vertical treatments with the Kratometer are given with the vertical prisms in the slides using an object at distance and also at near with the proper corrections refractively for the various distances. The object is to increase the weaker duction and the movement of the slides should be rather slow. Where the ductions are equal but low all around then they should be built up, alternating first one position of slides and then the opposite. It is surprising how quickly this anomaly responds to training. There are some types of convergence insufficiencies which will not yield to treatment until the vertical ductions have been equalized.

There are pseudo and real convergence insufficiencies and the question as to which it may be is largely determined from the phoria test which has preceded. If exophoria was found at distance and near and the amount at near was as much or greater than that at distance then the convergence insufficiency is most probably a real one. There is one, however, which simulates the real thing but yet is not. This is the one produced by exhaustion and the addition of the proper amount of plus serves to cure it without treatment. It is quite easily distinguished as the patient will be found to have a considerable change in his correction and they are usually young people.

The real insufficiency is treated with the daily application of base-out. The very bad cases may be helped by the addition of base-out prism to their corrections, especially the reading one, if they are presbyopes.

As mentioned before when there is a complication of a vertical hyperphoria with a convergence insufficiency it is found almost impossible to eliminate the trouble without first correcting the vertical deficiency. Almost always it will be found that if there is a right hyperphoria and the right eye is dominant that there exists a convergence insufficiency. I think this is one of the newer things which we have learned about the dominant eye.

In the case of amblyopia it must first be determined if the eyeground is perfectly healthy and if it is not, there is no use in wasting your time trying to remedy the situation. Given a case of amblyopia ex anopsia in a healthy patient of course the first consideration is the refraction which should be carefully checked at both distance and near, regardless of age. These are cases where bifocals are almost invaluable. In attempting a phoria test it is often impossible to obtain a phoria reading and the case history must be the guide. I strive to obtain a phoria test even if I have to utilize several different appointments in order to get it for it simplifies the procedure greatly. If the phoria test has shown our patient to be

esophoric, then a red or smoked glass is used over the good eye and it is dimmed to nearly the same degree of vision as its mate. Then base-in prism is run before the poor eye while it is looking at some object large enough to hold its attention. If any progress is made it will soon be evident that the details are more plainly seen than before and of course once the desire for binocular vision is aroused and encouraged it is simply a matter of time and patience upon the part of both patient and optometrist before the desired result is obtained. Naturally any supplementary work, such as reading with the poor eye alone, should be insisted upon. In those cases where binocular vision is lacking the use of prisms in the correction to make the patient diplopic if possible all assists toward a quicker recovery. Where the patient has a squint and vision is equal in each eye the improvement is rapid if the bases of the phoria tests are followed as a clue to the proper Kratometer work. There are a few exceptions to these cases. If an eye turns up and in, it is a case for a surgeon, likewise when it turns out and down. It is hoped that research now being conducted by some members of this Academy will result in the finding of a remedy for these conditions. There is hope, for the subject of alternating strabismus has already been conquered nonsurgically.

DISCUSSION. Dr. O. L. McCulloch opened the discussion by saying that the first essential in the use of the Kratometer is to make all measurements with the refractive correction before the patient's eyes. He also again emphasized that all phoria tests should be made with the Kratometer. He made the statement that when rotary prisms are used, there is danger of head tilting and faulty findings in phoria tests. On the fact that much emphasis is now placed on phoria test, hinges the basis of our work. He said further that the second essential in Kratometer technique is the determination of whether the patient possesses a fusion sense. He then criticized the mechanism of the Kratometer by saying that it lacked adjustment so far as pupillary distance was concerned, and that only the total pupillary adjustment could be made. Another drawback presented by him was that when trial case lenses are used, there is no provision to prevent the cylinders from turning from the desired position of their axis.

Dr. H. C. Doane inquired as to Dr. McCulloch's starting point in giving a Kratometric treatment.

Dr. O. L. McCulloch answered this by saying he always started by placing a 10 degree prism base-out over each eye, followed by this technic: To measure abduction for distance, turn slides base-in, distance correction in rear cells, P. D. set, any picture in the distance and a little below the horizon. If by use of the F-L card there is presented no suspicion of hyperphoria, we then ask the patient to look at the picture and to tell us as soon as the blur occurs, while we are moving the slides before his eyes. We make note of

the blur point and then go on and note the breaking point. We then reverse the direction of our slides and note the point of recovery. When the point of blur is low and the point of break is high and recovery good, there is latent hyperopia. He repeated also that we must remember two things; first, that esophores are entitled to full correction, and second, never to take the induction at near for a myope or an esophore.

Dr. B. S. Palmer asked if you ever have the experience that patients will tell you that the lower arm of the L on the F-L chart is blurred?

Dr. O. L. McCulloch said that this is a common statement on the part of patients if the chin rest of the instrument is too low and the card too high. Whenever such a statement is made by the patient, raise the chin rest and lower the card. If the condition persists, it is an indication of hyperphoria.

Dr. B. S. Palmer said that in the case I have in mind, I did not find a base-in or base-out prism requirement.

Dr. O. L. McCulloch replied that in such a case I would advise placing prisms so that one prism neutralized the other and run the slides up and down so as to cause the visual axis to swing in like direction.

Dr. E. E. Monroe inquired as to what method Dr. McCulloch used to determine the dominant eye.

Dr. O. L. McCulloch answered this by saying that he made a hole in a piece of paper and had the patient sight through it, thus determining which eye is seeing the target.

Dr. E. E. Monroe then asked if you exercise the non-dominant or dominant eye?

Dr. O. L. McCulloch said it makes no difference. I usually exercise the weaker eye.

The Academy then adjourned for luncheon, which was held at the Faculty Club. The afternoon session reconvened in the Physics lecture room of Columbia University, Professor F. A. Woll, occupying the chair. Professor Woll introduced Dr. R. B. Raup.

COMPLACENCY

Dr. R. B. Raup
New York, N. Y.

Prof. Raup warned his listeners not to think of complacency in terms of smug satisfiedness, but rather in terms of its correct derivation, to be pleased with, or of a state of equilibrium such as is brought about after recovery from a mental disturbance. There are many possible disturbances lying quiet until aroused by some trivial incident. He cited the experience of the mental reaction which comes to a man who has entered a cloak room after a normal experience at lunch and finds that his hat is missing, and how this disturbance has a tendency to disrupt his complacency; that there may be a tendency on the part of some individuals to recover from this first disturbance which indicates that someone has taken the hat either in error or on purpose. The search goes on and it is found that an old dilapidated hat is left in its place. Thus another disturbance is set up before recovery could be effected from the first, and so the disturbance curve could be agitated in a series of scollop like advances upward, and it depends entirely on the attitude of the individual so disturbed as to the number of added influences to disrupt equilibrium that will occur.

Whether or not he will recover from it depends upon the dominance of the attractiveness of the act to him and his ability to analyze the nature of the cause of the disturbance. The tendency toward equilibrium, the speaker said, seems to exist everywhere and, therefore, seems to prove the existence of complacency everywhere. As a foundation for his work Dr. Raup makes the assumption that there is a continuity between physical, biological, mental and spiritual worlds, a fact must be present in all, and that everything tends to seek a balance or state of equilibrium.

Tonus of the body or any organ of the body can be said to be measured by the relationship between the disturbing and restoring influences of equilibrium. Fundamentally, the autonomus nervous system must be kept in balance in order to continue complacency. Our state of complacency is dependent upon our habit forming tendency. By law of effect, a habit becomes fixed when it satisfies.

In analyzing the process of complacency, Prof. Raup cited three stages: First, the disturbance which tended to lead away from complacency; second, the bettering of control or movement toward a reduction in the disturbance, and third, the repetition. This last

classification, that of repetition is, said Dr. Raup, the process through which we go to establish a habit, becoming fixed only when the action is satisfying. He claimed farther that repetition is an endeavor to get the entire physical organization in accord with an act.

Dr. Raup's address was by way of explaining some of the factors that are involved in his theory of "Complacency" as it has been set forth in a book with that title. He said that complacency is the condition of dynamic equilibrium that constitutes the optimum state for the organism. "The first and chief business of living matter is to get into such relationships with other forms of matter as to maintain itself relatively constant while taking on their energy, utilizing it, and giving it off * * * * This satisfactory working relationship I have chosen to call complacency." It is the condition-from-which and the condition-to-which behavior is always in the process of moving. Annoyance is experienced when the equilibrium is disturbed by a stimulus; satisfiedness comes with the restoration of the optimum.

Evidence in support of the theory is cited from various fields. The irritability, conductivity, contractility, metabolism, and reproduction of living substance are all functions of complacency. A balance is maintained in the autonomic nervous system by the antithetical arrangement of the thoracico-lumbar and sacral divisions. Habit is the utilization of tried methods for the reduction of disturbances affecting complacency; a habit is fixed in accordance with the adequacy of its guardianship over equilibrium.

The speaker dwelt at some length upon the fact that habit is a function of this complacency condition and directed his discussion of the theory to the point where the student of vision, where he is concerned with the "habits" of the eye, could take it up and apply it to his own problems.

The meeting continued with Professor F. A. Woll occupying the chair. Professor Woll introduced Professor J. P. C. Southall.

ANCIENT AND MODERN THEORIES OF LIGHT

J. P. C. Southall, Ph. D.
New York, N. Y.

Starting with the corpuscular theory of Newton, Prof. Southall then carried it to the undulatory theory of Huygens to establish the theory that ether had to be accepted as a fluid. He then emphasized the importance of the contribution made by Young and Fresnel when they discovered those phenomena of light known as interference and polarization to further establish the theory that ether had to be considered as a solid. Thus ended the first century in the advances made to conquer the hidden mysteries of light and its influences, and the consolidation of the studies of Optics was begun with the work of Young and Fresnel.

The speaker then referred to the contributions made by Fraunhofer in his studies of the spectrum; to Volta and his contributions to the study of electricity; to Faraday and his development of the dynamo, and then to James Clark Maxwell who, in 1873, published a book on the theory of electricity and magnetism, thus showing the relationship between light and electricity and the sequence in which the various phases were developed. The next outstanding man in the sequence of the personalities involved in the development of the facts and unravelling of the mysteries of this most wonderful natural phenomenon came Helmholtz who, from the optometrists, and ophthalmologists' point of view, has probably made the most extensive contribution to visual optics of any of the scientists working in this field, regardless of their period. The influence of Helmholtz was carried on by one of his pupils, Heinrich Hertz who demonstrated the existence of electrical waves in 1899. Then came Lorentz with his electron theory. Next Fizeau who verified the findings of Fresnel and established what is known as the ether-drift-theory, or, in other words, the assertion that when light passes through a moving medium that the ether is dragged along.

Prof. Southall then brought his talk to a close by citing the contribution made by Einstein, first with his special relativity theories and, next, with his general relativity theories which he gave to the world in 1915.

Following Prof. Southall's address, Chairman Wiseman expressed his appreciation for the contributions presented by the various speakers. He then called attention to the display of models and specimens of the eye and nervous system which had been loaned by

the Clay-Adams Company, and invited the members to inspect them informally. This brought to a close the afternoon session.

At 6:30 P. M., the formal banquet was held at the Hotel Pennsylvania. Informal addresses were made by Mr. Roberts, Prof. Southall and Dean Pegram. All of these talks pointed toward the gratifying success Optometry is attaining by virtue of its honorable field of activity and its service-rendering scope. The speakers all agreed heartily with the principles upon which the American Academy of Optometry were founded and painted alluring pictures of the possibilities to be developed by a professional Optometry. Dean Pegram in his remarks presented an informal invitation to the American Academy of Optometry to make use of the facilities of Columbia University in carrying out research work and collaborative study.

Following the banquet, a business session was held, with Chairman, Dr. E. G. Wiseman, occupying the chair.

The following matters of interest were discussed. First, the establishment of a research fellowship in Optometry at Columbia University. Dr. E. G. Wiseman explained that Professor Pegram of that institution had invited the Academy to make use of the university's facilities, and that he believed that this was an opportunity to study some of our technical controversial problems. Second, that the American Journal of Optometry be designated as the official organ of the American Academy of Optometry. Third, that Chicago, Illinois, be selected as the meeting place for the 1928 meeting, and fourth, many of the phases entering into the matter of granting fellowship in the Academy were discussed. At the close of this discussion the Nominating Committee, headed by Dr. E. E. Hotaling, brought in the following suggestions as to the personnel of the officers to serve the Academy for the year 1928.

Dr. E. G. Wiseman, of Buffalo, N. Y., Chairman.

Dr. B. W. Hazel, of Baltimore, Md., Vice-Chairman.

Dr. J. F. Andreae, of Baltimore, Md., Secretary-Treasurer, and the following men for members of the executive council of the Academy. Dr. F. I. Tibbetts of Little Rock, Ark.; Dr. J. H. Drakeford, New York, N. Y.; Dr. Carel C. Koch, Minneapolis, Minn., and Dr. C. E. Cox, Rochester, N. Y. These men were duly elected. This concluded the business session.

(To be continued)

HEREDITY AS AN OPTOMETRIC FACTOR

G. O. Ohlsson, Opt. D.
Detroit, Mich.

Some months ago the writer presented a paper on "Heredity and Eyes," and having received a number of letters, some doubting the benefit to Optometry of such a knowledge, others expressing interest, and still others showing a comprehensive experience with the literature of heredity, I return to these pages. Because of these letters and also with a desire to arouse further interest, the present paper will submit matter not touched upon in the earlier article.

Optometry in common kinship with other professions serving humanity, must make itself felt socially, must approach social problems; must learn to aid in decreasing the number of these, even if elimination is yet afar off.

While it is true that to date, very few attempts have been made to classify those with defective vision, Germany and England have some statistics, but in the main these apply more particularly to myopes, and are prepared with more of an idea to gain information relative to progressive myopia than as a measure of the part, heredity, or for that matter, evironment play in connection with visual disturbances. On the other hand, a few observers in this country have come to partial conclusions, and while a percentage of error has crept in, it can do little harm to generalize somewhat.

It has been noted that in the matter of the "backward child"—a large number have defective vision, or are otherwise muscularly unstable. While my own experience has not been such as to give me a long list of cases, those coming under observation have given evidence of a general instabliity, and while improvement has been noted after visual correction, much remains to be desired. The contrast of "before and after" is certainly marked but what of the real comparison, that between the norm, and the case under our care?

The most unstable are those with a history of parent or parents with poor vision, especially those in the hyperopic classification. For several years I have been making a casual investigation of astigmats, especially those with a family history of astigmatism, and I cannot agree with those who say "astigmatism is not hereditary." Of course, I refer primarily to the higher amounts of astigmatism. It is indeed surprising that parents miss noting this defect as a possible cause of the discomfort or dullness in their own children, yet such is the usual experience.

It has become a rule with the writer to ask these "high" astigmats "how about your son or daughter?" Sometimes they are brought in, and usually I find my suspicions verified much to the surprise of parents. It is merely another method of obtaining material for observation as well as expressing an interest in prevention of eye strain, and carrying out our slogan "The Conservation of Vision."

We are all more or less familiar with what texts have to say on the subject of myopia, that is, as to the tendency to inherit, which I consider academic hair-splitting, when our experience shows us any number of cases which in the main are direct inheritances.

Allow me to set down one as an example:

Mr. V. Myope, low amount.

Mrs. V. Myope, slightly higher amount.

Two sons and two daughters, all myopes of low amounts.

The entire family is of particularly good physique. One son is a medical student, and beginning with a conversation on this matter of Heredity and Eyes, he also is devoting some time to a study of the subject.

Mr. V. furnished me with data as to his family history, which shows that his male parent was also a myope. History in the family indicates a high mental level throughout; a characteristic to be noted among the myopes of mild low and moderate amounts. German statistics have much to say on this item, some of which is apparently contradictory until all of the diagnostic material is examined.

One of the major problems in a study of heredity is the danger of putting "the cart before the horse." Causes and effects gather around their respective heads much cloud of language—statistics are made and then remade, or quoted in a wrong relationship. Because of this, it is indeed necessary that fundamentals be kept in mind.

Genetics stands second to physics as the most fruitful department of science during the last quarter of a century. It has, at least, made a few of us realize that our notions about equality were the result of our prating at too great length about our ideals, what we would like to have, rather than how we were to attain it. It is true that we must have equality of opportunity, and here is wherein I feel that Optometry can play a part. We can aid in making opportunity equal and see to it that those with defective vision get a fair start in the race of life. Such an equality is well within the bounds of reason and understanding. Was it not as East who, in one of his essays: "A Wise Man from the East," said, "Do men gather grapes of thorns or figs from a thistle." Almost uncanny is this old quotation in its reference to the effect of our inheritance.

Application of the laws of genetics has made possible improved strains of stock. Production of meat has been speeded. Less fear of disease exists because of improved stocks. Man has sifted out the less desirable characters of his four-footed servants, improving those

which are useful.

The same is true among plants. Man-made evolution has made rapid strides in adding to our food supplies. However the real interest of the biologist is not in these two important departments; rather he hopes to aid those functions of mankind which rate somewhat higher than eating, drinking and sleeping.

One geneticist asks this question: "Are you a physician? Well, then a study of heredity will enlarge your opportunities for successful treatment of all the various human ills, for the hereditary endowment of each one of us looms large in every pathological condition." One might add to this that optometrists need this same knowledge, because every correction carries with it the further effect of the individual's nervous, physical and mental make-up. All of these are the product of his or her inheritance, acted upon by the particular environment.

Every refractionist who stops to think about it at all, will agree with the truth of our statement. Your experience recalls many who have difficulty in accepting correction; others again offer dozens of new angles, which often disappear when an intelligent attempt is made to understand the whole situation. I admit again the often too difficult problem of differentiating between heredity and environment. Often, in spite of this confusion, we get results in our efforts with the consultant.

Has all of this a direct application in optometric practice? Reference can be made to Peckham. I remember in the course of a conversation with him, our discussion of the inheritance of types found in the industries. For instance, the exophores which were quite numerous among those of farm ancestry as well as those of peasant stock. They certainly were not from those of "close work" training. Their convergence power was really poorly developed. On the other hand, those whose ancestry was that of the "close work" class showed up as esophores. There may be much of error in this conclusion, although Prof. Shepard of the University of Michigan failed to prove the opposite to me. He stated that experiments with rats and other animals had not substantiated such a theory. I retorted that, so far, his experiments had been made with animals in which vision was not the dominant sense, and he in turn admitted that his chief difficulty was in that one particular. Many of the laboratory experiments have failed because of the same error.

Even the expert falls into the common error of confusing instincts and acquired characteristics, and it is only in the past three or four years that a more careful check has been kept, or better methods of control used to minimize the danger of reaching highly erroneous conclusions.

It is when we approach the matter of the myopes of high amount that we reach figures which are decidedly confusing, for the precentage of mentality rates very poor indeed. Clinical statistics seem to

show that the preponderance of these is among the "under classes" and this is not intended in a political or economic sense. Here again more surprises await us, for while some improvement is noted when the high hyperope is corrected, referring to "backward students," nowhere near the same amount occurs in the case of the high myope. Why?

Many authorities insist that every case of high myopia is a pathological case; I even go so far as to say that many are indeed mental cases. Think over your own experiences with these. This is quite reasonable to assume, for the eye is a portion of the brain itself. I am in contact with several families of myopes in which the amounts are all very high and the mentality is very, very low. Is one factor the cause of the other?

A judge said to me not so very long ago: "You would be surprised if you knew how many cross-eyed men and women appear before me." Ponder that remark and attempt to realize what might have been if these had received proper optometric treatment early in life.

I am prepared to admit this as an argument: Because these students were defective in vision, they were also backward in school work, and because of this backwardness, they did not receive an adequate education. This in turn furthered their anti-social attitude towards their fellows in society. You can easily see the vicious circle implied. We all prate about the excess of energy engendered when vision must be maintained under a defect. The so-called muscle cases are sufficient evidence.

Again, the comments made of and about the "cock-eyed" kid—"squinty" and "one-eye" also play a great part in forming the minds of these unfortunates. Yes, indeed it is an optometric problem.

I venture another illustration here:

Elizabeth H., age 7.

Apparently healthy, mother states she makes no progress in school. Comes home every other day with note from teacher; called "bad" in school. Very excitable.

Examination shows decided convergent squint, however with correction squint reduces easily.

Refraction:

O. D. + 3.50 D. Sph ⊃ + 2.00 D. Cyl. axis 60°.
O. S. + 4.50 D. Sph. ⊃ 1.75 D. Cyl. axis 120°.

Questioning, we ascertain father has always been "cross-eyed." Wears strong plus lenses. Our correction enables child to make some progress in school work. The greatest change is in deportment in school, as well as at home. This child is a student at school just outside of city limits, and where visual tests have not been instituted as yet. It is safe to assume that many such cases exist all over the world and only after such time as careful tests are made will we be

able to arrive at conclusions as to what benefit will be derived in a matter of behavior from a correction of visual defects of high amount. Welfare workers verify much of what I write, one saying: "I always ask for eye examination on the truant cases."

Now to return to our main subject. Wiggam has said: "One can approach very few of such problems intelligently without some knowledge of heredity, because he is then in total ignorance of one of the largest forces that enter every moment into human life, human character, and social destiny." Again this may be said of optometric corrections, for often a pair of glasses may make a great difference to the individul in his thinking and contacts; for in turn it may and often does affect his physical and nervous status; these again having some effect on his mental activities.

This paper is hardly the medium for an extended presentation of the mechanism of heredity. This is the province of the standard text, and that again on general grounds. However it will not be out of place to consider some phases of the discussion as to the inheritance of acquired characters, attempting to draw inferences from this to the more direct subject of our article.

The fertilized egg develops into an adult organism. Each generation has a source in a preceding generation. Genetics is not concerned with the broad questions of generation of groups or kinds of organisms. Instead, it is interested in the detailed inheritances of offspring.

The problem of the inheritance of acquired characters is over a century old, and as many opinions and conclusions exist as there are writers on the subject. Much is of value on both sides of the question, and again sometimes little of value, when the author allows his personal prejudices to color his conclusions, especially when he takes a religious tack or angle.

Two outstanding individuals have made copious investigations in the original argument although since their time much more has been accomplished. From the point of view that the older men are perhaps more interesting, I will make some mention of both.

August Feismann (1834-1914) who wrote The Germ Plasm (1893) and The Evolution Theory (1904) was one of the most active in denial of the inheritance of acquired characters. In his text, "The Germ Plasm" he states "the germ plasm or substance of sex cells, is the only material that passes from one generation to the next and that even the highest animals develop from a tiny mass of germ plasm (fertilized egg); that early in development germ tissue is differentiated from and set apart from body tissue and that germ plasm is not influenced or affected by external factors.

Lamarck, the Frenchman, in 1809, wrote his "Philosophy of Zoology," and took an affirmative position on the question of inheritance of acquired characters. Ever since that time, the battle has more or less raged, with pendulum-like results, one year the negatives seem to gain, next the affirmatives are in the ascendency. Despite

this age-old argument, it behooves us to keep informed as to the merits of both, making also as much of an examination of the part played by environment as is possible.

When it comes to the eye, most of the investigators agree as to the types and numbers of defects which are hereditary. Take for instance that form of color-blindness called Daltonism. When such a color-blind father marries a normal woman, he passes this defect through normal daughters to half of his grandsons, but not to his granddaughters. There are also accounts of rare cases of color-blind women marrying normal men, the sons inheriting the blindness from their mother and transmitting it to half her grandsons and granddaughters.

In conclusions to my remarks about Lamarck I set down here the two great laws which he enunciated:

1. The law of use and disuse. Frequent and sustained effort or use of an organ strengthens, develops and enlarges it; constant disuse gradually weakens it, decreases its usefulness, and finally causes it to disappear.

2. The law of inheritance of acquired characters. Everything that nature has caused individuals to acquire or lose by the long effects of external conditions, and so by predominant use of an organ, or its lack of use, it preserves by heredity, and passes on to new individuals which descend from it, provided that the changes are common to those which have given origin to new individuals.

Without some such theory as a basis for many of the visual functions it would be difficult to account for their appearance today. Indeed evolution itself depends upon that very activity for its existence. It accounts for the upright posture of man.

In addition we may make some observations as to the difference in length of fingers as compared to toes. Early in the life of man, both must have been the same or nearly so in order that both have the same "hanging-on strength."

Amblyopia-exanopsia can hardly be explained on any other basis and putting such an eye back to work with its mate, is merely acting on our understanding of the natural law involved.

I prophecy that, when we have learned more about heredity, we will be able to do more for those of our patients who fall in the class with a definite inheritance of eye defects. For it is reasonable to assume that scientific investigation of causes is the only logical method to pursue when seeking remedies or cures.

My closing suggestion is that we continue our work on the basis that Optometry is a profession, having this in common with others of a like nature; to serve humanity. This calls for our taking into our knowledge all of the factors which may aid us in benefiting our patients.

G. O. OHLSSON,
1516 WASHINGTON BLVD.,
DETROIT, MICH.

OCULAR ELECTROTHERAPY

J. I. Kurtz, B. S., A. O., F. A. A. O.
Minneapolis, Minn.

CHAPTER IV.

PHYSICS OF HIGH FREQUENCY CURRENT

High Frequency Current is one which has a very high number of cycles completed in the space of one second. It is an alternating (oscillating) current in which the frequency is beyond the point of producing muscular contractions. The ordinary commercial alternating current completely reverses itself 120 times per second and is known as a 60 cycle current.

A Cycle is made up of two alternations, one positive alternation and one negative alternation which make up a cycle as illustrated in figure 4.

An Alternation is a complete reverse of the direction of the current. This is illustrated in figure 5.

The Alternating Current is one in which the current is constantly changing its direction and polarity as is illustrated in figure 5, and is in contrast to the direct current.

The Direct Current is one which always acts in one direction; that is, from positive to negative, and is represented by a straight line.

An Oscillation is a series of diminishing waves which flow alternately in opposite directions. An oscillating current produces series of waves which do not correspond to semi circles, the waves are rather diminishing and assume any form of wave as illustrated in figure 6. Any two of them represent a complete cycle.

The 60 cycle current is the one most generally used. There are, however, some places where 125 and 133 cycle currents are used. Most all of the electrotherapeutic equipment is constructed to be used on a 60 cycle current.

The time required for the current to make a complete cycle is called a *period*. *The frequency* is the number of complete cycles occuring in one second of time.

The ordinary commercial current of 60, 125 or 133 cycles not only is devoid of therapeutic values but is rather painful and dangerous. It is only high frequency current that possesses therapeutic properties.

The flow of electricity thru a conductor possesses attributes and characteristics analogous to those of a stream of water, falling from a height or flowing thru a pipe. In this last case, the amount of water flowing thru the pipe in a given time and the size and diameter of the stream, would depend upon the diameter, length and resistance of the pipe, this to be taken in consideration with the speed of the stream or the pressure which causes it to flow. The same is equally true of an electric current. Electricity of a given pressure or potential will create a current of a certain volume or intensity in a circuit of a given resistance. The electrical units of *pressure, volume and resistance* are designated as *Volt, Ampere and Ohm.*

A Volt is defined as an electrical unit of *pressure* or *potential.*

An Ampere is an electrical unit of *volume* or *intensity.*

An Ohm is an electrical unit of *resistance.*

The Volt is considered to be to an electrical current what the pressure pound per square inch is to a stream of water. This gives us an idea of the electrical pressure that is known as the "Electro-Motive Force," which is usually found abbreviated in physics as "E. M. F."

The Ohm, which is the unit of resistance, is represented by a column of mercury one millimeter in diameter and one meter high.

The pressure of one Volt acting on the resistance of one Ohm will cause the flow of a current of one Ampere.

Of these three factors mentioned—voltage, amperage and resistance—if two are known, the third factor may be easily found by the use of "Ohm's Law" formula which may be expressed in three ways:

$$C = \frac{E}{R};\ R = \frac{E}{C};\ E = CR.$$

"C"=Current volume in Amperes.

"R"=Resistance in Ohms.

"E"=Electro-motive force in Volts.

Characteristics of High Frequency Current

An electric current when made to oscillate or change its direction of flow ten thousand times or more per second acquires some astonishing characteristics. All of the accepted theories of electricity as applied to ordinary commercial current are overthrown and some completely new phenomena are exhibited, which are entirely contrary to our conceived notions about electricity. For instance, we are aware that when ordinary current, having a frequency of 60 or 125 cycles per second, is passed thru the human body, muscular contractions take place which produces the sensation of an "electric shock." The "shock" becomes quite unpleasant and painful when the voltage is over 100 and becomes dangerous to life itself when the voltage is 500 or 1,000. When the current, however, is made to oscillate and change

its direction of flow with a frequency of 10,000 or more cycles per second, it may be safely applied to the human body without any degree of danger and if the frequency is increased to reach into the millions, the sensation of the shock or of muscular contraction is completely absent and in its place is felt a sensation of warmth.

D'Arsonval[19] in 1888 found that when a current is applied in tetanizing a muscle and the number of interruptions were increased, the intensity of the phenomena of excitation was correspondingly increased until a maximum of from 2,500 to 5,000 excitations a second was reached; after this point an increase in the frequency caused a decrease in the degree of excitation. At that time D'Arsonval was unable to obtain a sufficient frequency of oscillation entirely to suppress muscular contraction. In December, 1890, he used the apparatus of Hertz and with it he was able to obtain millions of electrical excitations a second. He was thus able to suppress all mucular contraction by applying this very high frequency current. D'Arsonval was the first to demonstrate the characteristic phenomena of high frequency currents. In 1891, Nicola Tesla was the first to advocate the use of high frequency currents for therapeutic purposes.

The Velocity of an Electric Wave

The velocity of an electric wave can be calculated if we know the frequency and the wave length by using this formula:

$$V = WF;\ W = \frac{V}{F};\ F = \frac{V}{W}$$

V=Velocity.

W=Wave Length.

F=Frequency.

If we have a wave length of 300 meters and a frequency of 1,000,000, then V=300 X 1,000,000=300,000,000 meters.

It has been established that the velocity of electromagnetic wave is practically the same as the velocity of light that is 186,000 miles per second, which is about 300,000,000 meters. If one keeps in mind that a single cycle of current in an open circuit sets in motion a single electric wave, we arrive to these results which may be expressed in the formula as given above, namely, that the length of one wave is equal to 300,000,000 divided by the frequency of oscillations.

Wave lengths in meters	Frequency in cycles per second
100 " " "	300,000,000
400 " " "	750,000
1,000 " " "	300,000

An ideal machine would be one in which a variation could easily

be made in voltage, inductance and capacity and then a frequency could be selected which will best suit the particular case to be treated.

Grover[20] conducted a series of experiments to determine the heat effects of the different rates of frequency and he obtained the following results: Using a bare metal disc electrode two inches in diameter, placed at each end of the mass of liver. The current strength used was 300 milliamperes, voltage not obtainable, frequency 3,000,000. A thermometer was placed in the center of the mass equidistant from each electrode. These are the results of experiment Number XX:

Temperature at outset 70 F.
Temperature after 10 minutes 100 F.
Temperature after 20 minutes 108 F.
Temperature after 35 minutes 114 F.

Experiment XXI.—Material, electrodes and all settings same as in Experiment XX except the frequnecy which was 1,600,000.

Temperature at outset 70 F.
Temperature after 5 minutes 100 F.
Temperature after 8 minutes 108 F.
Temperature after 10 minutes 114 F.

Experiment XXII.—Material, electrodes and all settings same as in Experiment XX except the frequency which was 900,000.

Temperature at outset 70 F.
Temperature after 3 minutes 100 F.
Temperature after 6 minutes 108 F.
Temperature after 7 minutes 114 F.

When the temperature in the center attained 114 F, the heat was equally distributed throughout the entire mass. The time required for the heat to extend from the center to periphery of mass was relatively the same with all frequencies. These experiments were repeated many times and the results obtained were practically always the same.

Conclusions

1. The higher the rate of frequency, the less the conversion of electric into caloric energy.

2. The degree of heat developed in the tissues is in inverse proportion to rate of frequency.

3. The lower the frequency the higher the voltage required to secure currents of quantity.

4. Heat effects with a frequency of 900,000 are very much greater than those with higher frequencies.

Applying a high frequency current through a vacuum electrode (a glass tube from which the air has been expelled), will stimulate the blood circulation, thus bringing it to the surface and increasing the nutrition. This current can be applied to the body generally or locally. It has the effect of a tonic upon the patient, claims Strong,[21] it gives him added vigor, the same as a powerful tonic at the same time, does not have the unfavorable after effect of the drug stimulant.

(To be continued)

DR. J. I. KURTZ,
209 YEATES BLDG.,
MINNEAPOLIS, MINN.

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THE EFFECTS OF NICOTINE ON THE AUTONOMOUS AND CENTRAL NERVOUS SYSTEM

F. E. Holder, Opt. D.
Kearney, Nebraska

It should be said at the outset that the purpose of this article is not to induce one to give up smoking. The writer believes that most men have always felt within their hearts that smoking is harmful to them in some way. There has been an immense amount of medical research into the subject; it has been carried on for years. All I aim to do in this article is to give men and women a few facts about nicotine, and its physiological effect on the human system. Let me start by saying that Prussic acid is considered to be the deadliest of all poisons. Nicotine almost approaches it in poisonousness, and often as rapidly.

It takes about one-sixth of a drop of nicotine (about 11 milligrams) to kill a cat or rabbit. From one-half to two drops placed upon the tongue of a dog will kill it almost instantly. The amount required, apparently, depends upon the canine. A drop placed even on the eye of a sparrow or a white rabbit will kill the creature at once. According to one authority, the amount required to kill a good stout horse is eight drops and the action takes place in four minutes.

As to homo sapiens, the amount required to kill one of us is from 60 to 120 milligrams depending of course upon our age and condition. This is from one to two drops. In a single ordinary cigar, there is enough nicotine, if it were extracted and injected internally, to kill two full grown men.

A great many people have the idea that the nicotine is completely burned up in the tobacco before the smoke enters the mouth. This idea is completely fallacious and a really dangerous misconception to have. The London Lancet, one of the leading medical journals of the world (and every experimenter has found the same to be true) discovered that tobacco smoke Always contained nicotine. How much was present—that is, how much of the original nicotine content had been destroyed by burning—always depends on the variety of the tobacco and the form and mannner in which it is smoked. In some cases, ninety per cent of the original nicotine is destroyed by the burning; in other cases, as little as twenty per cent is destroyed, and eighty per cent is freed from the tobacco and remains in the smoke.

In other words, the reason one cigar, or a few cigarettes will not

kill the user is obvious: First, a varying proportion of the nicotine present is burned up. Second, what remains in the smoke is taken into the mouth and almost all of this (except by inhalers) is blown out again. But, what one must remember is that a certain proportion of the nicotine, which you take in your mouth Is absorbed into your system every time you smoke.

Now, how much is absorbed into the system in each case varies with different factors. It depends, first, obviously, on the total amount of nicotine in the particular cigar, cigarette or pipeful of tobacco. Different species of tobacco leaves, vary greatly in their nicotine content; in some tobacco, 8% of the volume, by weight is nicotine; in others the content is as low as 2% by weight. It depends, even to a greater extent, upon the moistness of the tobacco and the thoroughness with which it burns. The drier the tobacco, the more nicotine is destroyed in combustion. Taking a standard Virginian cigarette, a doctor by the name of Dixon, in his experiments, found that when three-quarters of it was consumed, about three milligrams of nicotine was present in the resulting smoke. "It must not be assumed," he says, "that all of this is absorbed in the system, but in the case of an inhaler most of it certainly is, perhaps 75 per cent. Hence, if a cigarette smoker were to puff ten cigarettes on end, he would certainly absorb 20 to 30 milligrams of nicotine—enough to produce a profound physiological effect, though, administered in this way perhaps ten to fifteen times under the lethal dose."

Now, what is the effect upon the human system of the small amount of nicotine that is absorbed every time one smokes the ordinary cigar, cigarette or pipe? The effect is first upon the nerves and through them, of course, upon the various organs and bodily processes. All experiments show conclusively that the effect is one of stimulation to the nerves, followed by depression. Nicotine differs from other strong drugs like morphine, heroin and cocain in this respect—in that it affects every nerve in the body; they effect the central nervous system only. Nicotine does affect the brain and spinal cord, but also the entire autonomic nervous system, which controls those vital operations of our organs that keep our bodies functioning properly.

Now, in learning specifically what results from this effect on the autonomic nervous system, one should be warned not to jump to the conclusion that, because they have not experienced the particular trouble mentioned, either that they are immune to nicotine-poisoning, or that the scientists are wrong.

The fact is, that the list of ailments that individual physicians and scientists have, at one time or another, attributed to nicotine, printed in this size type, would probably be as long as one's arm. I am going to append a list of some of them just as a matter of interest. Opinions differ upon several of these listed. In these

ailments mentioned some of them have been completely proved to be caused by nicotine. Here is a partial list:

Gastritis and dyspepsia.
Hyper-acidity in the stomach.
Destruction of appetite.
Kidney degeneration.
Favoring of tuberculosis.
Ronchi (irritation) in lungs.
Tobacco angina pectoris.
Neurasthenia.
Amblyopia.
Color blindness.
Extrasystole of the heart.
Asthmatic attacks.
Apoplexy.
Premature senility.

The commonest effect of nicotine is upon the digestive organs—particularly upon the elementary canal, down which the food goes, and upon the stomach, in which the food is largely digested. Careful X-ray experiments, carried on with both smokers and non-smokers, show that nicotine at once causes the muscles of the elementary canal to stop working; and that within fifteen minutes after one smokes a cigar the normal automatic movements of the stomach stop. They remain stopped until about three minutes after the smoking has ceased when they begin again. Another practically immediate effect of the nicotine is to increase the flow of secretion from the elementary glands, and the digestive juices in the stomach, and then to depress them. Hyper-acidity, excess of hydrochloric acid in the stomach, is thus a common trouble of smokers.

After the digestive system, the next unquestioned effect of nicotine is upon the heart and the circulating system. First: the use of tobacco increases the pulse rate from five to ten beats a minute and in the case of the man who is continually smoking the increase of rate becomes permanent. This increased pulse rate is accompanied with a small rise in blood pressure, which begins a few minutes after smoking commences and lasts as long as one smokes. This fact is particularly important for those to know who are inclined to a high blood pressure, with its attendant dangers. It is also pretty well accepted that the heart of even a moderate smoker is less efficient in periods of strain. All athletes know this very well. More serious effects upon the heart, caused by nicotine absorption, are sometimes palpitation and arrhythmia. They usually disappear when smoking is stopped. Arterio-sclerosis is easily produced in animals by the injection of nicotine, but the proof as to men is not conclusive, although there is a weighty body of opinion which holds that heavy smoking at least favors arterio-sclerosis.

Now, I have mentioned above a few parts of the autonomic

nervous system which are affected by nicotine. But nicotine affects the central nervous system as well—the brain and the spinal chord. Its main effect here is a sedative. Whether it affects mental efficiency injuriously has been the subject of a great deal of debate. The consensus of opinion, from the experiments, seems to be that at least it is not helpful to clear thinking and energetic action in daily living.

There is one serious eye disease that should be mentioned which some believe arises from nicotine—absorption, Tobacco Amblyopia. This causes dimness of vision and frequently loss of sight.

Then there is the effect of nicotine upon the liver. What this is, directly, is in doubt. The indirect effects, however, are marked. It is the liver that is responsible for "detoxicating" nicotine—that is, preventing it from having the full effect it otherwise would have. The nicotine comes into the mouth in smoke; there is an immense surface of mucous membrane in the nose, mouth and lungs, and air passages, an area from 800 to 2,000 square feet. Every three minutes the entire blood in the body is spread over this area, and the blood absorbs some of the nicotine from the smoke. The blood passes through the liver and that faithful organ detoxicates as much of the nicotine collected as it can.

Now, as a summary to that which has been briefly said, I have but this to say regarding the smoking habit. Smoking is unquestionably harmful in some degree. Its really serious effects arise from the amount of nicotine absorbed into the system. Extreme moderation should therefore be advised in the use of the weed.

DR. F. E. HOLDER,
KEARNEY, NEB.

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UNCORRECTED ERRORS OF REFRACTION AS A FACTOR IN THE DEVELOPMENT OF CATARACT

It is to be frequently observed that patients suffering from asthenopic symptoms due to uncorrected errors of refraction are also found to be suffering from lenticular opacities in their incipient stages, and it is also observed that these opacities are usually further developed in the eye which shows the greater error of refraction.

It is still too early to predict just what definite significance one can place on these observations but that there is some connection in the otherwise normal patients, it seems reasonable to believe. Many pathologists now believe that in an otherwise normal patient, uncorrected errors of refraction will predispose the case to cataract. However, since the development of cataract is most usually accompanied by changes of refraction it becomes difficult to judge or estimate their direct or indirect responsibility for the disease.

Henry Kirkpatrick, in his book on the Treatment of Cataract, (Oxford Medical Publications, 1921), claims that it is possible that, should a constitutional cause for the disease exist, even in a small degree, the presence of an uncorrected error of refraction may be sufficient to induce the formation of a lens opacity in the affected eye. An eye, the subject of an error of refraction, appears to be specially liable to ocular complications of diabetes, nephritis and focal sepsis, and, if this be so, it is only to be expected that such an eye would be

exceptionally susceptible to cataract formations, should a constitutional cause of the disease be present.

Assuming that errors of refraction are in part at least responsible for the development of cataract it would not be unreasonabe to expect that the development of these metabolistic changes in the lens proteins would be arrested by the correction of the refractive error. And we all know how frequently this is apparently true. Every optometrist has cataract patients for whom he has carefully prescribed optical appliances over a period of years where the development of the opacities has remained unchanged and not infrequently will a small opacity disappear entirely after the errors of refraction have been suitably corrected. C. C. K.

BOOK NOTICES

REPORT OF THE STATE BOARD OF EXAMINERS IN OPTOMETRY, STATE OF MINNESOTA. E. H. Kiekenapp, editor. Published by the State of Minnesota for the Minnesota State Board of Examiners. 144 pages. Paper covers. 1929.

In opening this book the reader finds the first portion given over to the Optometry Act now in force in the State of Minnesota. Following this one finds the financial report of the Board; the report of the Board to the Governor; data regarding Law Violations; data on Optometric Education, Colleges and Legal Requirements; the report in full of the first Conference to Establish Optometric Educational Standards; an outline of the State Board's procedure in examination; a copy in full of their rules and regulations; the code of Ethics adopted at the 1923 meeting of the A. O. A.; the A. O. A. report on Nomenclature; a partial list of Optometric literature and a complete list of all Optometric practitioners licensed by the Minnesota State Board of Optometry.

This work, coming as it does from the State printer, is nicely gotten together and the Board through its Secretary has placed much material of interest within its covers. This is without question the most exhaustive, published State Board Report at hand to date, and should add much to the prestige of the Minnesota Board.

C. C. K.

ANNOTATIONS AND SOCIETY PROCEEDINGS

The American Journal of Optometry is the official Organ of the American Academy of Optometry, as well as the Organ of the Arkansas, Delaware, Iowa, Maine, Maryland, Michigan, Minnesota, Nebraska, North Dakota, Oklahoma, Pennsylvania, South Dakota, Vermont and West Virginia Optometric Associations.

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COMMENTS ON SKEFFINGTON'S GRADUATE WORK

Dr. Olive J. Hatcher, optometrist of Fort Forth, Texas, in a recent letter to the editor of this Journal comments at some length on unusual work accomplished by Dr. A. M. Skeffington. In part she says: "If a man discovers a great boon to humanity and does not share it with his fellow man, the world justly execrates him. If one finds gold bearing soil, he stakes his own claim first and then calls in the world to share his good fortune. With this thought in mind, with the idea of sharing with Optometrists and less abstractly, with individual Optometrists, something we have found valuable, I write.

"Four years ago," continues Dr. Hatcher, "at the convention in Dallas, we had a speaker, Dr. A. M. Skeffington. In his work there was much that was puzzling, and many things, most perhaps, seemed obscure and yet running all through his talk and his work was a thread of earnestness and a vision that seemed to be curtained from the rest of us. Those attending applauded the words of the speaker more, perhaps, than the contents, and then went home to promptly relapse into exactly the same rut they had known before.

"Then, two years ago, this same man, came to Texas and gave week long clinics in several of our cities. One here in Fort Worth. Obviously, there was something in this we were missing. We began to perceive dimly that it was not the fault of the work itself, but rather that we were not thinking properly. This lesson was borne home the more strongly, because of the tremendous earnestness of the message conveyor himself. After the clinic, it was the candid

opinion of the men that they had gained little. It was also their opinion that this was true because they had failed to grasp his underlying principles. Abortively many have tried some of the methods, found some value and then found puzzling facts coming to thwart us and finally more or less abandoned and again reverted to former methods.

"This last year, Dr. Skeffington, not being able to get to Texas, offered to send us Extension Work. A study group was organized and slowly light began to dawn, tremulously but surely. Then, we called to Dr. Skeffington to come to us for a week again and work with us. We have recently completed this week of Graduate Clinical Work. Doubtless, you will hear more of this from officers and proper authorities. But, as one of the rank and file, speaking to the others in the same category throughout the country, I hope you will find place for this.

"We have staked our share—we want to tell the world about this find. Here is the man and the method. All these years, we have worked on a rule-of-thumb basis that covered the obvious conditions and let the problems sail by untouched, to the detriment of the profession and the gradual tearing down of that fine respect on the part of the public that can only be gained by attaining the unusual. We were quite content to be 'as good as' simply because we found no better way.

"Building up from the work of all men, with a genius for making coherent and workable that which was inchoate and unworkable, with a revealatory diagnostic method that is so superb that it held us wrestling and questioning for hours, taking our problems and showing where we had failed, examining cases that had baffled all of us and bringing out the needs and necessities, teaching us to *Think* and not guess, truly here was a new realm, a wider sphere and now we understood the earnestness, the detached severity and conviction that had permeated all this man's words and work. *He* has a vision of Optometry that has never been seen before.

"If a man scoff at the thought of Optometry as a great Diagnostic Profession, before he levels his aim, let him sit for the week in the actual clinical work and he will find that he came to scoff and stayed to work and learn, humbly and joyously. The world is ready for this work. Dr. Skeffington spoke to the Advertising Club and showed them the almost romantic ideal of rehabilitating the eyes of a generation to fit them for this new Era. He talked at the Texas Christian University and held that crowd of students spellbound and when he had finished, the unprecedented request was made that he stay and talk more to the Graduate Class of Teachers. There he showed how a great service to humanity could be performed by the co-operation of teacher and Optometrist.

"Here is the greatest vision," continued Dr. Hatcher, "that ever came into Optometry. And, here is the mouthpiece that makes that

vision an actual and living reality. None can question his science and the public drinks of his words. Isn't there some way to utilize this genius to an even greater advantage than at present? Where in our National Association? Where is our Publicity Department? Where is the Educational Department? Men have been clamoring for years to the National Association for the very things Skeffington extends without stint. Surely the genius of those who lead us can magnify the potentials of this many hundredfold.

"We had read of his speaking—and considered it but little. Today, as an individual, without official connection, knowing full well that officers and committee chairmen will make you full report, it is my hope to speak to the rank and file. To that incoherent group who hold no office and have small voice, I say, 'under no condition miss this man and under no condition fail to get him into your community and before every large group of adults that can be assembled. No monetary value can be placed on Clinical Work. Knowing what we know now, any of us would travel far rather than fail to gain that which we have gained. And then to cap the huge purely Optometric value comes this man with the message to public and profession alike, of a new world, of a new work, that is so great, of such unimaginable value, that it places Optometry, in one scant half-hour, on the plane of the greatest of the professions bearing gifts to mankind.'

"So we say, as said before, 'Never man spake as this man spake,' not in the world of Optometry until this time."

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WEST VIRGINIA ASSOCIATION OF OPTOMETRISTS

Dr. D. L. Gallagher, secretary of the West Virginia State Association of Optometrists, announces that the annual gathering of this society will be held at the Chancellor Hotel, Parkersburg, West Virginia, on April 22nd, 23rd, 24th, 25th and 26th. Dr. A. M. Skeffington will be the chief clinician for the period mentioned and reservations for this graduate work should be made at once, according to Dr. Gallagher, as a large attendnce is expected.

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OKLAHOMA ANNUAL CONVENTION

Dr. E. B. Alexander, Duncan, Oklahoma, secretary of the Oklahoma State Association of Optometrists, announces that the Annual Convention of this society will be held in Oklahoma City, April 15th, 16th and 17th. Dr. W. S. Farmer is in charge of the educational program which will be announced later.

"IT sure does seem good to get credit for a good job. Always did do the best we could; turned out good lenses, too, if I do say it as shouldn't.

"But now we have accurate new tools to work with, gauges to check them, and the best of everything.

"And Orthogon* lenses have got to be right to get by the inspection they put on them; curves O. K., polish O. K., segments just so, focus right to a hair. Never knew we could work so close till we had to.

*Patent Pending

ORTHOGON

Wide-Vision Lenses